FINAL

FIELD SAMPLING PLAN FOR MAIN AND PROTECTED AREA DECONTAMINATION FACILITIES

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado 80604

ENVIRONMENTAL RESTORATION PROGRAM

MAY 1994

RFP/ER

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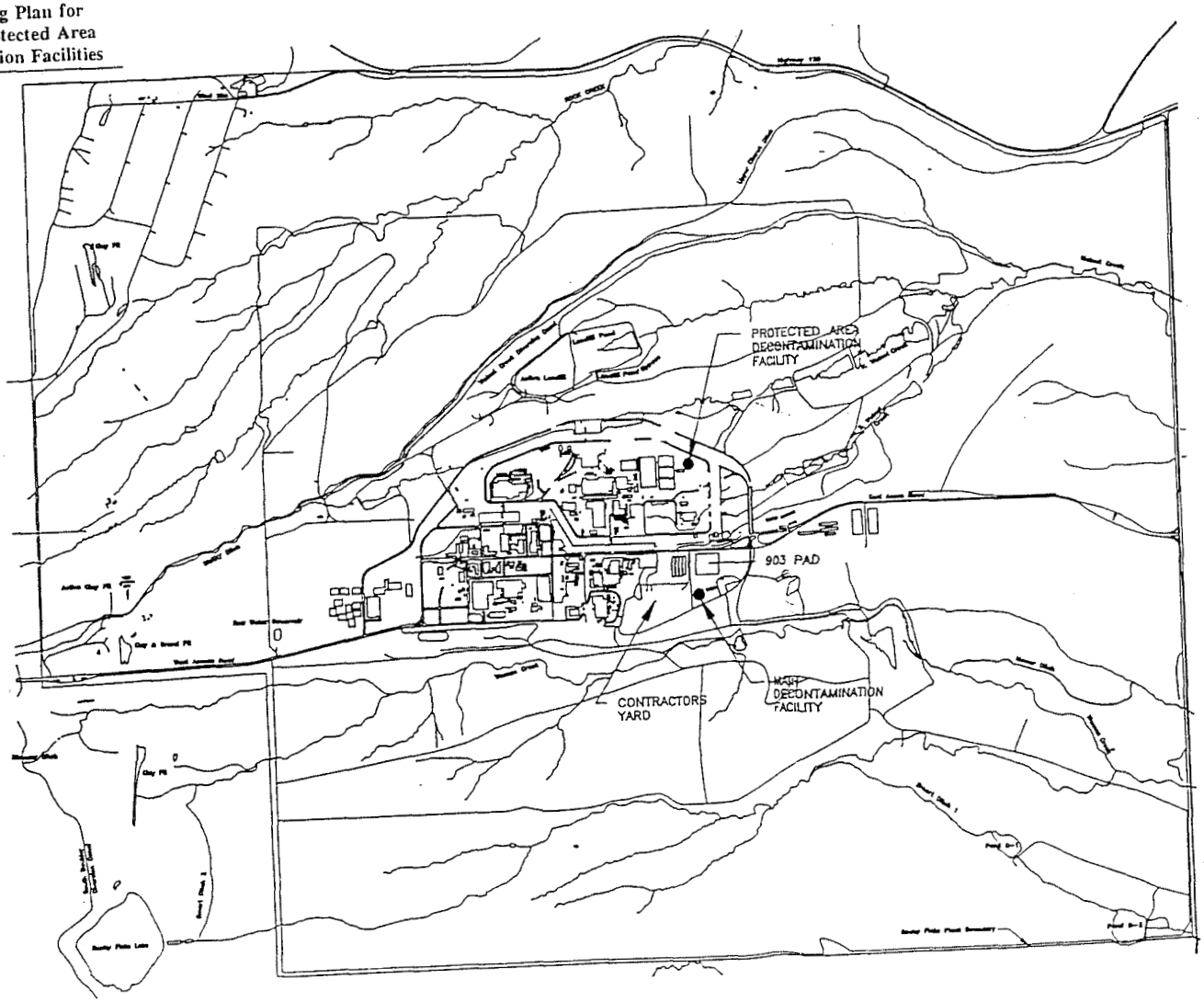
1.0 INTRODUCTION

1.1 Purpose and Scope

The Field Sampling Plan (FSP) summarizes the sample collection and sample handling procedures to be used at the two decontamination facilities at the Rocky Flats Plant (RFP). Each decontamination facility consists of three functional areas: the equipment decontamination pad, the environmental liquids management area, and the drum transfer area. The facilities were constructed to provide a controlled location and system for decontaminating equipment used in the Environmental Restoration Program in compliance with the Resource Conservation and Recovery Act (RCRA). The facilities are designed to decontaminate equipment and to collect, store, and manage wastes from decontamination activities. The wastes generated from these activities are then sampled and characterized for transfer and final disposition or storage by EG&G Rocky Flats, Inc. (EG&G). The wastes include aqueous and solid wastes.

This FSP is applicable to two decontamination facilities: the Main Decontamination Facility (MDF) and the Protected Area Decontamination Facility (PADF). The MDF was constructed in March 1991 and is in the southeast corner of the contractor's yard next to the 903 Pad at RFP. The PADF was constructed in November 1992 and is located in the northeast corner of the Protected Area. Access to the PADF requires special security procedures which include a vehicle search, a personal property search, and an escort for uncleared personnel. The location of these facilities is shown in Figure 1-1, Facility Locations. MDF and PADF operations are briefly discussed in Section 2.0, Overview of Decontamination Facility Operations.



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SCALE : 1 INCH = 2000 FEET

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DECONTAMINATION FACILITIES
FIELD SAMPLING PLAN

FACILITY LOCATIONS

1.2 Related Documents

This FSP is one of several documents that make up the complete documentation for the decontamination facilities. The other documents not included but incorporated by reference are:

- 5-21000-OPS-FO.3, General Equipment Decontamination.
- 5-21000-OPS-FO.4, Heavy Equipment Decontamination.
- 5-21000-OPS-FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.
- 5-21000-OPS FO.12, Decontamination Facility Operations.
- 5-21000-OPS FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples.
- Health and Safety Plan (Accident Prevention Safety Program Plan) Decontamination Facility Operation, Version 2.0.
- Sitewide Quality Assurance Project Plan for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities.

1.3 Organization of the Field Sampling Plan

This FSP is organized into five sections. Section 1.0 is the introduction. Section 2.0 presents information on the operation of the decontamination facilities. Section 3.0 presents the sampling and analysis plan for the waste streams at the decontamination facilities, and Section 4.0 presents quality assurance/quality control (QA/QC) methods. Section 5.0, presents the references cited.

2.0 OVERVIEW OF DECONTAMINATION FACILITY OPERATIONS

The decontamination facilities are designed and operated for decontaminating equipment potentially contaminated from various environmental restoration field activities at RFP and for managing the wastes produced as a result of the decontamination. Decontamination is required for reassignment or reuse of equipment, tools, and machinery to prevent potential cross-contamination and to provide for such equipment and materials to be released off the RFP site. Types of equipment decontaminated at this facility include drill rigs, drilling augers, sample coolers, environmental storage containers, tanks, and various excavation equipment. Decontamination of equipment is a required activity to prevent the potential for personal exposure, and the spread of contamination to other parts of RFP and offsite. All decontamination work is performed in accordance with the Decontamination Facility Health and Safety Plan (HASP).

The decontamination facilities are used by approved and trained personnel in accordance with 5-21000-OPS-FO.12, Decontamination Facility Operations, under the guidance of the designated subcontractor (DSC) personnel. All personnel using the facilities are required to contact the DSC manager to schedule time(s) for decontamination of their equipment at the facilities. Operations of the decontamination facilities are described in Section 9 of 5-21000-OPS-FO.12, Decontamination Facility Operations.

A general understanding of the decontamination facilities is best achieved by reviewing the facility layout, the basic flow diagram, and the major components of the system. The subsections that follow include a brief overview of both decontamination facilities' systems, geographic locations, and equipment and support facilities.

2.1 Facility Description

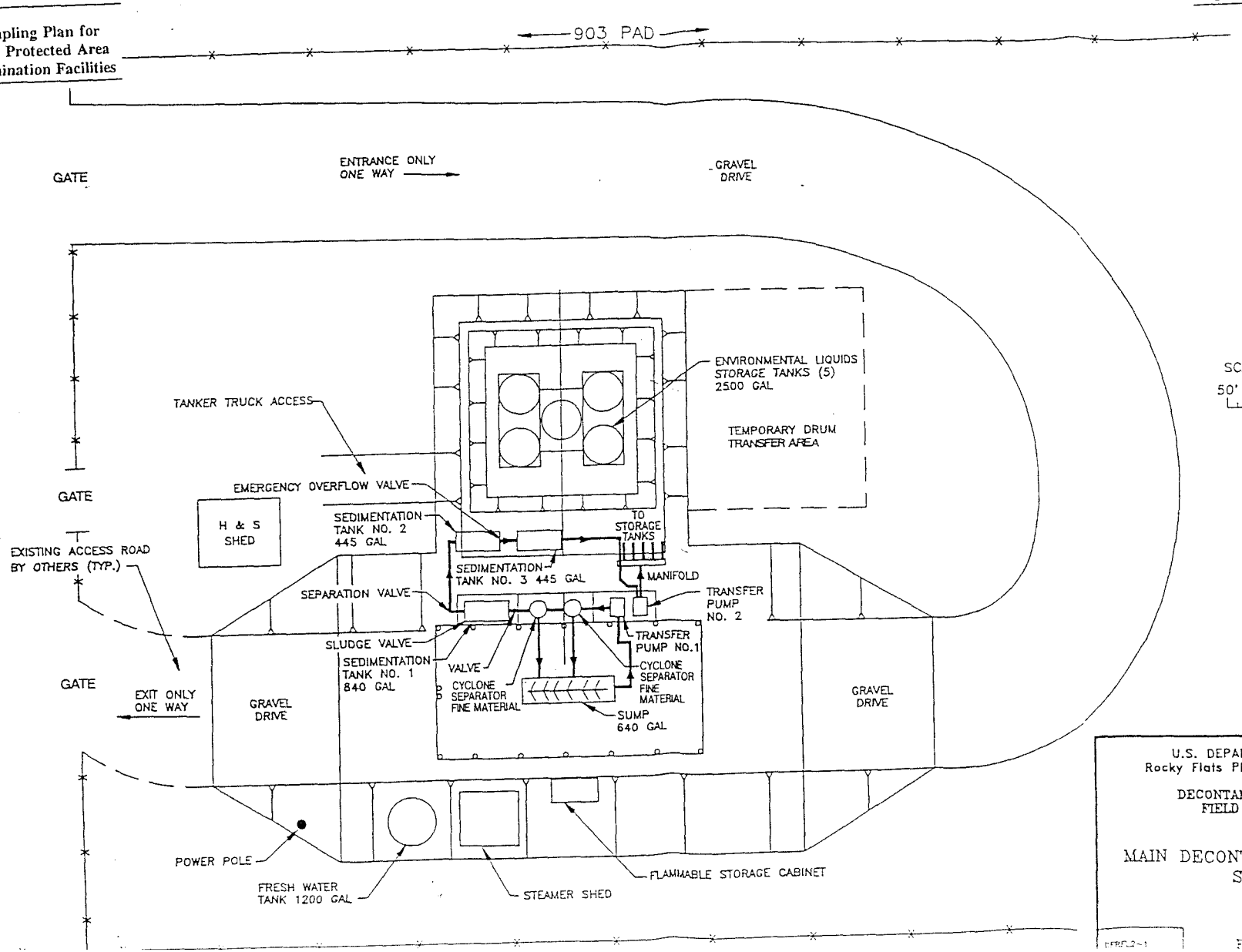
Each decontamination facility consists of three functional areas: the equipment decontamination pad, the environmental liquids management area, and the drum transfer area. The layout of the MDF is shown in Figure 2-1, Main Decontamination Facility Site Plan, and the layout of the PADF is shown in Figure 2-2, Protected Area Decontamination Facility Site Plan.

2.1.1 Equipment Decontamination Pad

The equipment decontamination pads include a drainage system, a sump for collection of fluid runoff, and a pumping system for moving liquids from the sump to the environmental liquids management area. Wet sediments are sampled, removed from the sump, drummed, and stored for eventual disposal.

2.1.2 Environmental Liquids Management Area

The environmental liquids management area consists of five 2,500-gallon storage tanks enclosed by berms, and three sedimentation tanks between the bermed area and the decontamination pad. The capacity of one sedimentation tank is 840 gallons, and the capacities of the remaining two sedimentation tanks are 445 gallons. Environmental liquids are pumped through two cyclone separators and into the sedimentation tanks. When the residual sediments have settled, the relatively sediment-free liquids are then pumped from the sedimentation tanks to the large storage tanks. When the storage tanks become full, the liquids are sampled, analyzed, and transported to an on-site water treatment facility.



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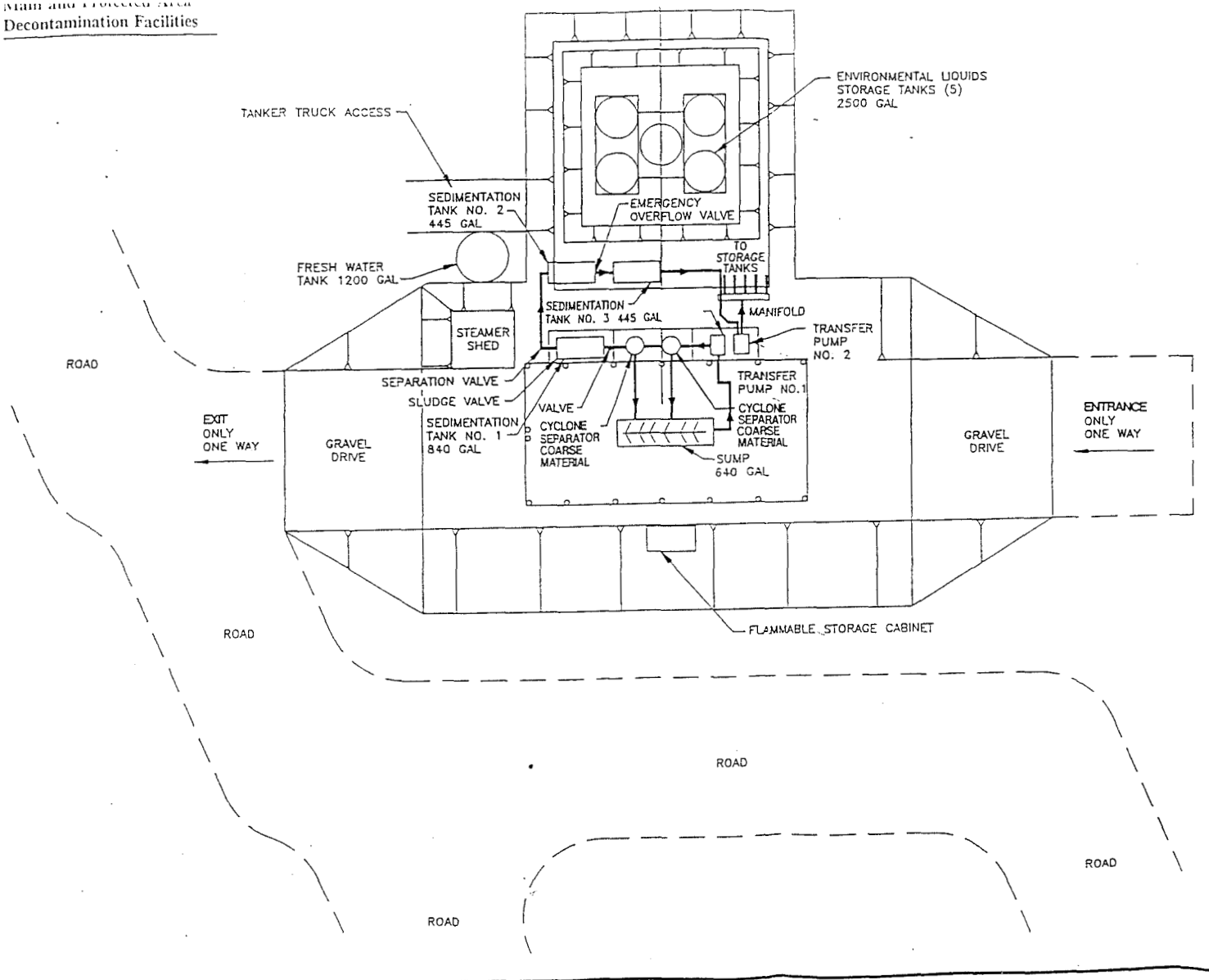
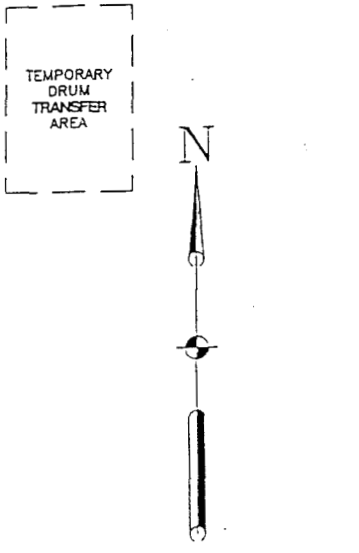
DECONTAMINATION FACILITIES
FIELD SAMPLING PLAN

MAIN DECONTAMINATION FACILI
SITE PLAN

FIGURE 2-1 OCTOBER





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DECONTAMINATION FACILITIES
FIELD SAMPLING PLAN

PROTECTED AREA
DECONTAMINATION FACILITY
SITE PLAN

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FIGURE 2-2 OCTOBER 1993

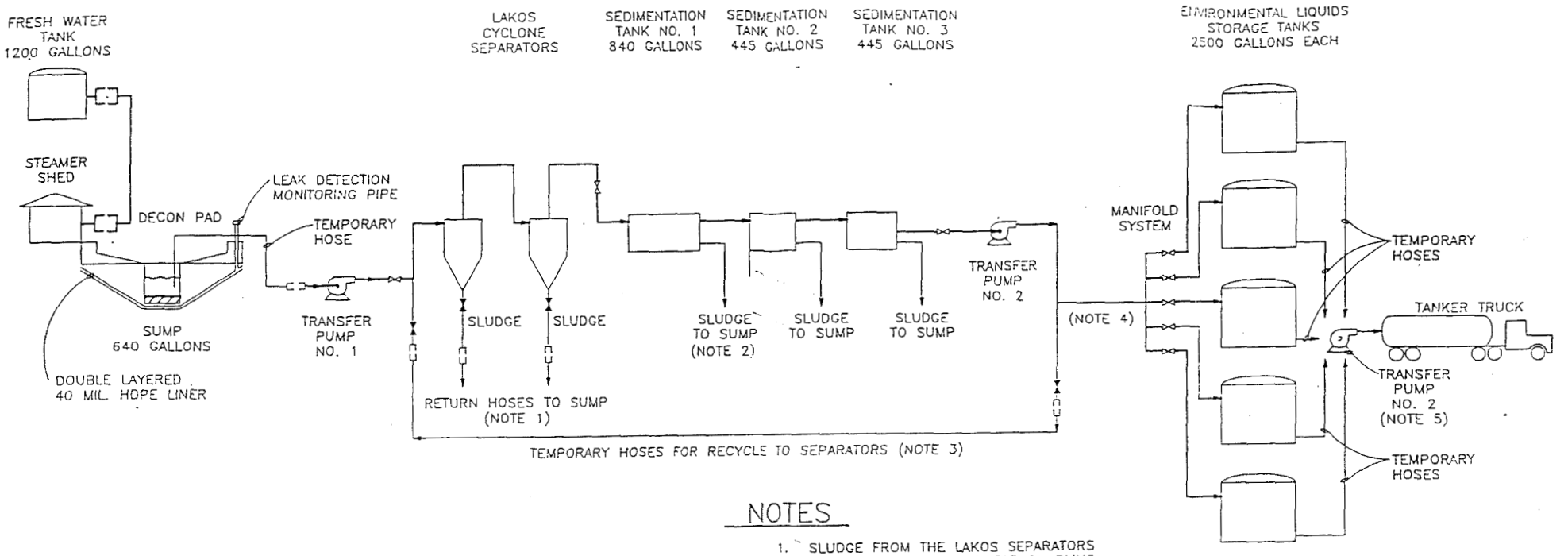
2.1.3 Drum Transfer Area

The drum transfer area is where the DSC transfers gray drums containing sediments and solids from decontamination activities to designated EG&G representatives. Procedures and documentation for drum transfers are performed in accordance with 4-F99-ENV-OPS-FO.23, Management of Soil and Sediment Investigation Derived Materials (IDM).

2.2 General Flow Diagram and Description

Traffic flow through both decontamination facilities is designed to be one-way so that potentially contaminated equipment moves in one end and decontaminated equipment moves out the other end.

Operation of the facilities includes several processes to collect, store, manage, and transfer waste from decontamination activities. The entire pad is underlain with a double layered 30-ml, low-density polyethylene (HDLD) containment liner to capture liquids falling onto the pad area, which allows the liquids to flow to the bermed area. Spills, leaks, or precipitation that fall on the pad area are collected and pumped through the system. Figure 2-3, Process Flow Diagram is a process flow diagram showing the system. The equipment staged on the decontamination pad is washed using a high-pressure steam and clear water rinse. The pad splash curtains are closed during use to retain liquids on the pad. Soil, debris, sludge, and environmental liquids are washed off the equipment and deposited on the decontamination pad. The environmental liquids, soil, debris, and sludge generated from decontamination operations are washed to the center of the pad where they pass through a grate and are collected in the sump below the decontamination pad. The sump can contain up to 640 gallons of material and provides for the initial separation of large, heavy particles, such as rocks and sand, from the liquid.



NOTES

1. SLUDGE FROM THE LAKOS SEPARATORS RETURNS TO THE SUMP FOR SAMPLING.
2. SLUDGE FROM THE THREE SEDIMENTATION TANKS IS REMOVED BY HAND AND RETURNED TO THE SUMP FOR SAMPLING.
3. WATER FROM THE THIRD SEDIMENTATION TANK CAN BE RETURNED TO THE LAKOS SEPARATORS VIA TRANSFER PUMP NO. 2 IF THE WATER IS DETERMINED THROUGH VISUAL INSPECTION TO BE NOT CLEAR.
4. TRANSFER PUMP NO. 2 ALSO TRANSPORTS WATER THROUGH THE MANIFOLD AND INTO THE SELECTED STORAGE TANKS.
5. TRANSFER PUMP NO. 2 ALSO TRANSPORTS WATER FROM THE STORAGE TANKS THROUGH THE MANIFOLD TO SEPARATORS AND OUT TO THE TANKER TRUCK.

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TYPICAL DECONTAMINATION FACILITY
FIELD SAMPLING PLAN

PROCESS FLOW DIAGRAM

FIGURE 2-3 **OCTOBER 1993**

Environmental liquids are pumped out of the sump and through two cyclone separators to remove a large portion of the remaining small, suspended particles. The liquid then gravity-feeds through a series of three temporary gravity settling tanks to remove fine-grained particles before transfer through the cyclone separators to the waste water storage tanks.

Periodically, the sediments collected in the sump, cyclone separators, and sediment tanks are placed in the sump and sampled. The sediments are then drummed and placed in the drum transfer area for transfer to EG&G Environmental Operations. Final disposition of the drums is determined by EG&G Environmental Operations after the sample analysis is completed to characterize the material in accordance with RCRA 40 Code of Federal Regulations (CFR) 261.30 and radiological analytes (see Table 3-5, Decontamination Facility Sediment/Soils Sample Containers, Preservation, and Holding Times). When the 2,500-gallon waste water storage tanks are filled, the liquid is sampled after sediments have settled for at least two days, and then analyzed by an EG&G-approved laboratory. Based on the results of the sample analysis, EG&G will determine the appropriate facility for disposition of the tank liquids (see Tables 3-1, Building 891 Environmental Liquid Treatment Facility Maximum Allowable Influent Concentrations, 3-2, Building 374 Environmental Liquid Treatment Facility Maximum Allowable Influent Concentrations, and 3-3, Sampling Locations and Frequency). The liquids will then be pumped into a tanker truck and transported to the EG&G-selected facility. Sampling procedures and required analyses are discussed in Section 3.0 of this FSP.

2.3 Equipment

The equipment used in operation of the decontamination facilities relevant to this FSP are described in the following subsections.

2.3.1 Pad and Sump

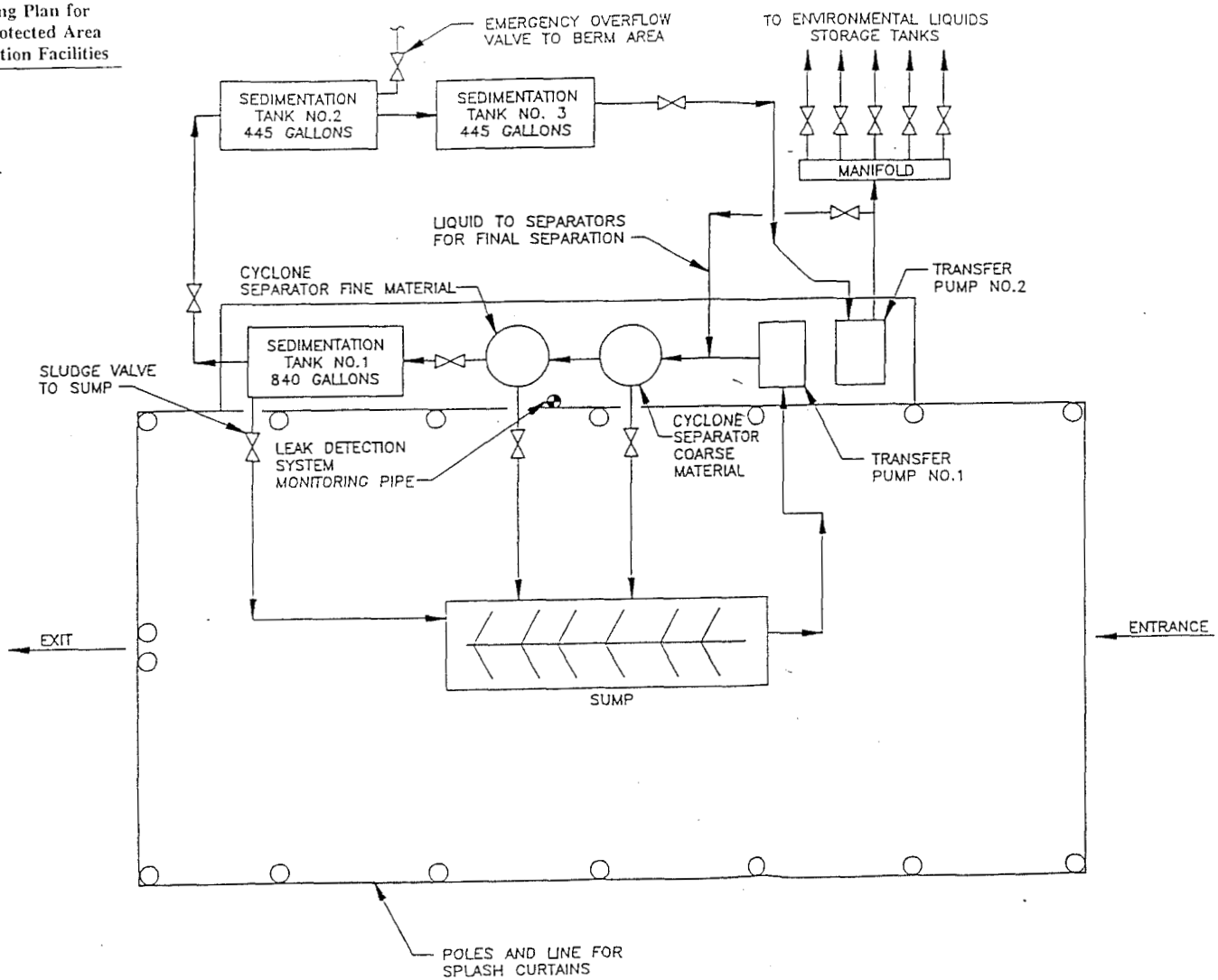
The decontamination facilities use a 20-foot by 50-foot concrete pad capable of holding large equipment for cleaning. The entrance and exit are sloped and curbed to contain and collect waste water, solids, and sludge generated during cleaning operations. The pad is sloped for equipment access. A 640-gallon sump below and in the middle of the pad collects waste materials. The layout of the decontamination facilities is shown in Figure 2-4, Decontamination Pad Layout.

2.3.2 Pumps

Each facility uses three gasoline-driven pumps for day-to-day activities. Two transfer pumps are stationary and are designed to pump environmental liquids. One transfer pump is used to transfer liquid through the cyclone separators and into the sedimentation tanks and through the mainfold system. Another transfer pump is used to pump liquid from the five 2,500-gallon waste water storage tanks to the transfer truck. A mobile pump is used to transfer clean water from the truck-mounted mobile tank into the 1,500-gallon clean water tank. This pump is also used for various clean water pumping in the decontamination facility and for filling the shower trailer clean water storage tanks.

2.3.3 Cyclone Separators and Sedimentation Tanks

The process of separating the solids from the environmental liquids generated at the decontamination facilities uses two cyclone separators in series. The cyclone separators remove a large portion of the suspended particles remaining in the liquid from the sump. After it passes through the cyclone separators, the liquid is gravity-fed through three settling tanks connected in series.



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TYPICAL DECONTAMINATION PAD LAYOUT

DFRSL248

FIGURE 2-4 OCTOBER 1993

These tanks provide additional removal of solids by using gravity settling. The tank sizes are as follows:

- Sedimentation Tank No. 1 - 840 gallons
- Sedimentation Tank No. 2 - 445 gallons
- Sedimentation Tank No. 3 - 445 gallons

These tanks are shown in Figures 2-1, 2-2, 2-3, and 2-4. If the facility operator determines through visual inspection that sufficient solids removal has not occurred within the cyclone separators or the settling tanks, the environmental liquid is pumped back through the cyclone separators.

2.3.4 Storage Tanks

The decontamination facilities use a variety of tanks to store liquid wastes and clean water. Five 2,500-gallon waste water storage tanks at each facility provide storage to allow sampling and transfer by tanker for final disposition. One 1,500-gallon clean water storage tank provides a source of clean water for steaming and washing. Additionally, small mobile water tanks (typically 300 to 500 gallons) are used in daily activities in the decontamination pad. These tanks are attached to or contained within a box-van vehicle to transfer water between the potable water source at RFP and the 1,500-gallon clean water storage tank at the decontamination pad.

2.3.5 High-Pressure Steam/Water Cleaners and Steam Shed

The facilities use one high-pressure steam/water cleaner each. This cleaner, used for the decontamination activities on the pad, is in the 6-foot by 8-foot steamer shed. The steamer has a pressure wand that normally applies wash water to equipment at 140°F. Environmental liquids from this operation drain to the decontamination pad sump for collection.

2.3.6 Storage Containers

The DSC is responsible for moving, inspecting, and inventorying environmental waste storage containers generated at decontamination facilities. The following equipment is used to perform these activities:

- Open top 55-gallon drum used to contain sediment from the sump, cyclone separators, settling tanks, or other potentially contaminated solid waste generated from decontamination activities
- Wooden pallets used to transport and store 55-gallon drums
- Solid Waste Containers used for uncontaminated, expendable materials or trash which may include paper towels, plastic sheeting, and personal protective equipment (PPE)

3.0 SAMPLING AND ANALYSIS PLAN

This section describes sample collection and analysis for liquid and solid waste at the decontamination facilities. Samples are collected from two areas: the waste water storage tanks and the decontamination pad sump. The sampling procedures and analysis plans are outlined below. Operations Procedures (OPS)s applicable to sampling activities are:

- 5-21000-OPS-FO.3, General Equipment Decontamination.
- 5-21000-OPS-FO.06, Handling of Personnel Protective Equipment.
- 5-21000-OPS-FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.
- 5-21000-OPS-FO.12, Decontamination Facility Operations.
- 5-21000-OPS-FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples.
- 4-B11-ER-OPS-FO.25, Shipment of Radioactive Materials, Samples.

Environmental materials generated or encountered at the decontamination facilities that require handling and/or sampling will normally fit into one of the following categories:

- Unrepairable equipment
- PPE worn by facility users decontaminating equipment or environmental materials
- PPE worn by designated subcontractors working at the decontamination facilities
- Environmental liquids brought to the decontamination facilities by subcontractors and environmental liquids generated during decontamination of equipment and environmental material containers
- Sediments in the decontamination pad sump

The handling and/or sampling of each of the previously mentioned categories is described in the 5-21000-OPS-FO.12, Decontamination Facility Operations. Materials other than those listed previously mentioned will require coordination with the appropriate EG&G Environmental Restoration Management (ERM) representative to obtain handling procedures. These procedures will be obtained before the materials can be handled or moved onto the decontamination facilities.

3.1 Environmental Material Handling

3.1.1 Unrepairable Equipment and PPE Worn by Decontamination Facility Personnel and Users

Unrepairable and nonreusable equipment will be thoroughly decontaminated, surveyed, and placed in a solid waste container for uncontaminated environmental materials. EG&G radiological engineering will be contacted for guidance before disposal.

PPE worn by personnel working at the decontamination facilities will be radiologically surveyed and transferred to Environmental Operation Management representatives for appropriate storage or disposal.

PPE worn during decontamination of equipment and/or environmental material containers used in the field will be disposed of in the same manner as the PPE used during the field operations that warrant the decontamination activity. All PPE is handled in accordance with 5-21000-OPS-FO.06, Handling of Personal Protective Equipment.

3.1.2 Environmental Liquids

Environmental liquids brought to the decontamination facility will be emptied into the decontamination pad sump or sedimentation tanks designated by the DSC. Users who bring environmental liquids to the facility will enter the quantity, source [to include Individual Hazardous Substance Site (IHSS)], well number, date, and other relevant information into the facility logbook. These liquids and the water generated in decontamination activities at the facility are pumped into the storage tanks from the sedimentation tanks. As the storage tanks become full, the tanks are sampled. Sample collection procedures are described in Section 3.2, Sample Collection Procedures. Section 3.3, Analysis Plan presents the analytical suite.

The bullets listed below describe the steps involved in handling the environmental liquids from the 2,500-gallon liquid storage tanks. Implementation of these steps will ultimately identify the on-site treatment facility that can accept and treat the environmental liquids based on laboratory analytical results. The two treatment facilities that are currently approved to handle environmental liquids are Building 374 Liquid Waste Treatment and Building 891 Treatment Facility.

- The DSC samples the storage tanks and ships the samples to EG&G-approved laboratories for analysis.
- The DSC and the EG&G Project Manager receive and review a copy of the analytical results.
- Based on the analytical results, the EG&G Project Manager determines which on-site treatment facility will receive the environmental liquids. The maximum allowable influent concentrations for acceptance of environmental liquids at Buildings 891 and 374 are shown in Tables 3-1 and 3-2, respectively. Table 3-3 lists information for environmental liquid disposition flow chart.

TABLE 3-1
BUILDING 891
ENVIRONMENTAL LIQUID TREATMENT FACILITY
MAXIMUM ALLOWABLE INFLUENT CONCENTRATIONS

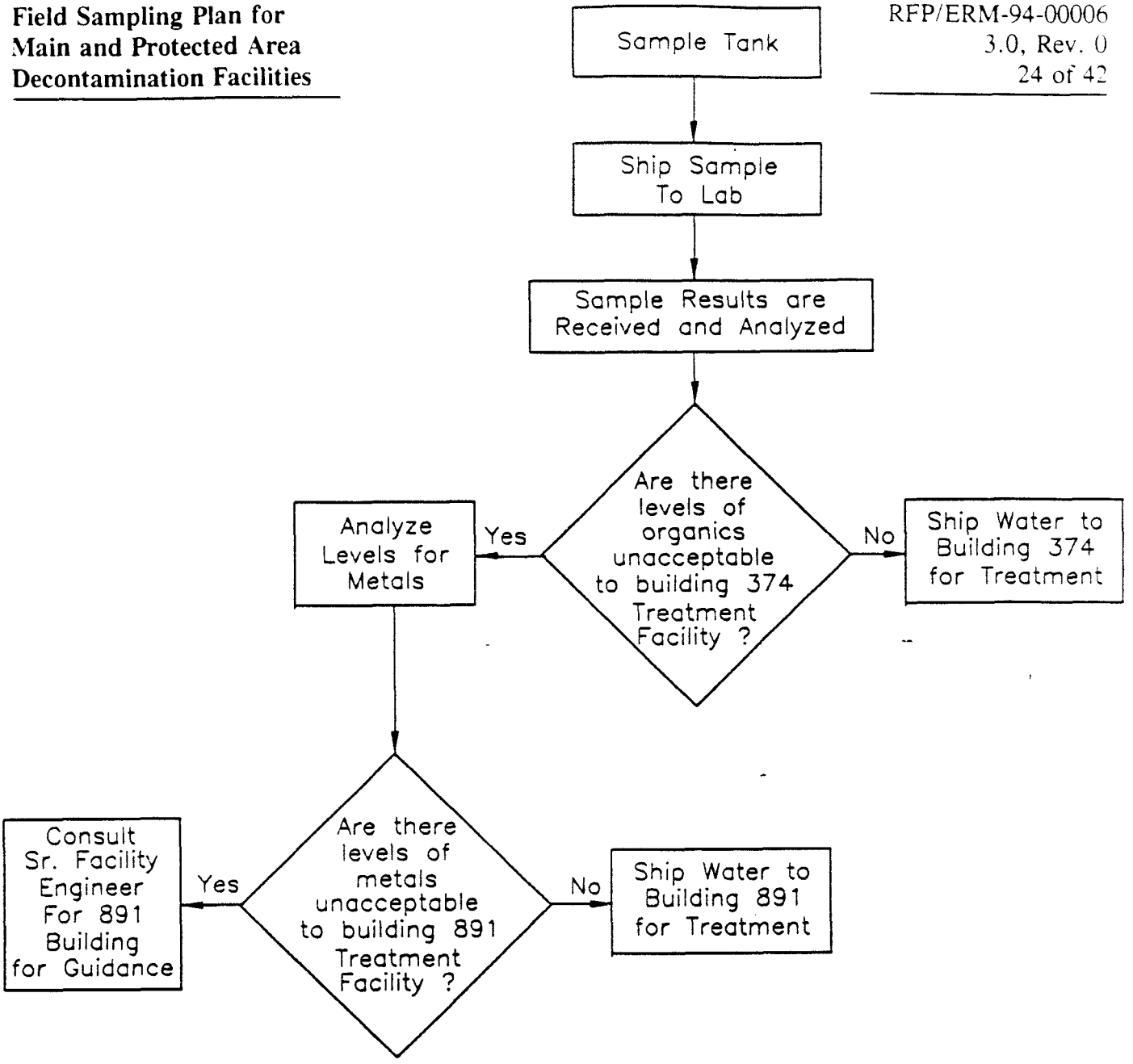
ANALYTE	MAXIMUM CONCENTRATIONS	UNITS
VOA	below 500	µg/l
Nitrate & Nitrite	100	mg/l
Total Dissolved Solids	718	mg/l
Gross Alpha	15	pCi/l
Gross Beta	50	pCi/l
Total Suspended Solids	5	mg/l
Turbidity	5	NTU
Chloride	128	mg/l
Sulfate	250	mg/l
pH	6.0-9.0	s.u.
Dissolved Metals		
Aluminum	5.0	mg/l
Antimony	0.06	mg/l
Arsenic	0.05	mg/l
Barium	1.0	mg/l
Beryllium	0.1	mg/l
Cadmium	0.01	mg/l
Chromium	0.05	mg/l
Copper	0.2	mg/l
Dissolved Iron	0.8	mg/l
Iron	0.3	mg/l
Lead	0.05	mg/l
Lithium	2.5	mg/l
Manganese	0.0738	mg/l
Mercury	0.002	mg/l
Molybdenum	0.1	mg/l
Nickel	0.2	mg/l
Seleium	0.1743	mg/l
Silver	0.05	mg/l
Thallium	0.01	mg/l
Vandium	0.0391	mg/l
Zinc	2.0	mg/l

Maximum concentration Limits for Building 891 Treatment Facility located in T891A.
Date - August 1993.

TABLE 3-2
BUILDING 374
ENVIRONMENTAL LIQUID TREATMENT FACILITY
MAXIMUM ALLOWABLE INFLUENT CONCENTRATIONS

ANALYTE	MAXIMUM CONCENTRATION	UNITS
Gross Alpha	13,500	pCi/l
pH	6.0 - 12.0	s.u.
VOA 524.2*		
Viny Chloride	0.002	mg/l
Benzene	0.005	mg/l
Carbon Tetrachloride	0.005	mg/l
1,2-Dichloroethane	0.005	mg/l
Trichloroethylene	0.005	mg/l
para-Dichlorobenzene	0.075	mg/l
1,1-Dichloroethylene	0.007	mg/l
1,1,1-Trichloroethane	0.2	mg/l
cis-1,2-Dichloroethylene	0.07	mg/l
1,2-Dichloropropane	0.005	mg/l
Ethylbenzene	0.7	mg/l
Monochlorobenzene	0.1	mg/l
o-Dichlorobenzene	0.6	mg/l
Styrene	0.1	mg/l
Tetrachloroethylene	0.005	mg/l
Toluene	1.0	mg/l
trans-1,2-Dichloroethylene	0.1	mg/l
Xylenes (total)	10.0	mg/l
Dichloromethane	0.005	mg/l
1,2,4-Trichlorobenzene	0.07	mg/l
1,1,2-Trichloroethane	0.005	mg/l

*Required by Building 374
Maximum Limits - Building 374 - Cold Side
Date - April 23, 1993



Golder Associates Denver, Colorado	TITLE: DECONTAMINATION FACILITY ENVIRONMENTAL LIQUIDS DISPOSITION		
CLIENT/PROJECT: EG&G - ROCKY FLATS DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN	DRAWN: TR	DATE: MAY 1994	JOB NO.: 933-2672
	CHECKED:	SCALE:	DWG NO./REV. NO.: 2672A002
	REVIEWED:	FILE NO.: 2672A002	FIGURE NO.: 3-3

- The EG&G Project Manager notifies the DSC of the destination of the liquid. The EG&G Project Manager also notifies EG&G Trucking who will in turn supply a tanker truck. DSC pumps the liquid into the tanker truck.

- The EG&G Project Manger notifies EG&G Trucking when the tanker is full and has been properly labeled by the DSC. Trucking transports the environmental liquid to the appropriate facility.

3.1.3 Sediments in the Decontamination Pad, Sump, Sedimentation Tank Bottoms, and Cyclone Separators

Periodically, solids from the sedimentation tanks and cyclone separators are combined with the sediment already in the sump for sampling. Sample collection procedures are described in Section 3.2. Upon collection of samples for chemical analysis, the sediments are placed into gray drums. Labeling and handling of the drums will be performed in accordance with 5-21000-OPS-FO.10, Receiving, Labeling, and Handling Environmental Materials Containers. The drums will be placed in the drum transfer area pending analytical results and transfer to EG&G.

3.2 Sample Collection Procedures

Sample collection procedures for the environmental liquids and sediments generated at the decontamination facilities are outlined in the following subsections. Sampling locations and frequency are summarized in Table 3-4. Soil/sediments are sampled to determine if RCRA D-list analytes are present at levels unacceptable to EPA. Refer to Table 3-5 for soil/sediment disposition flow chart.

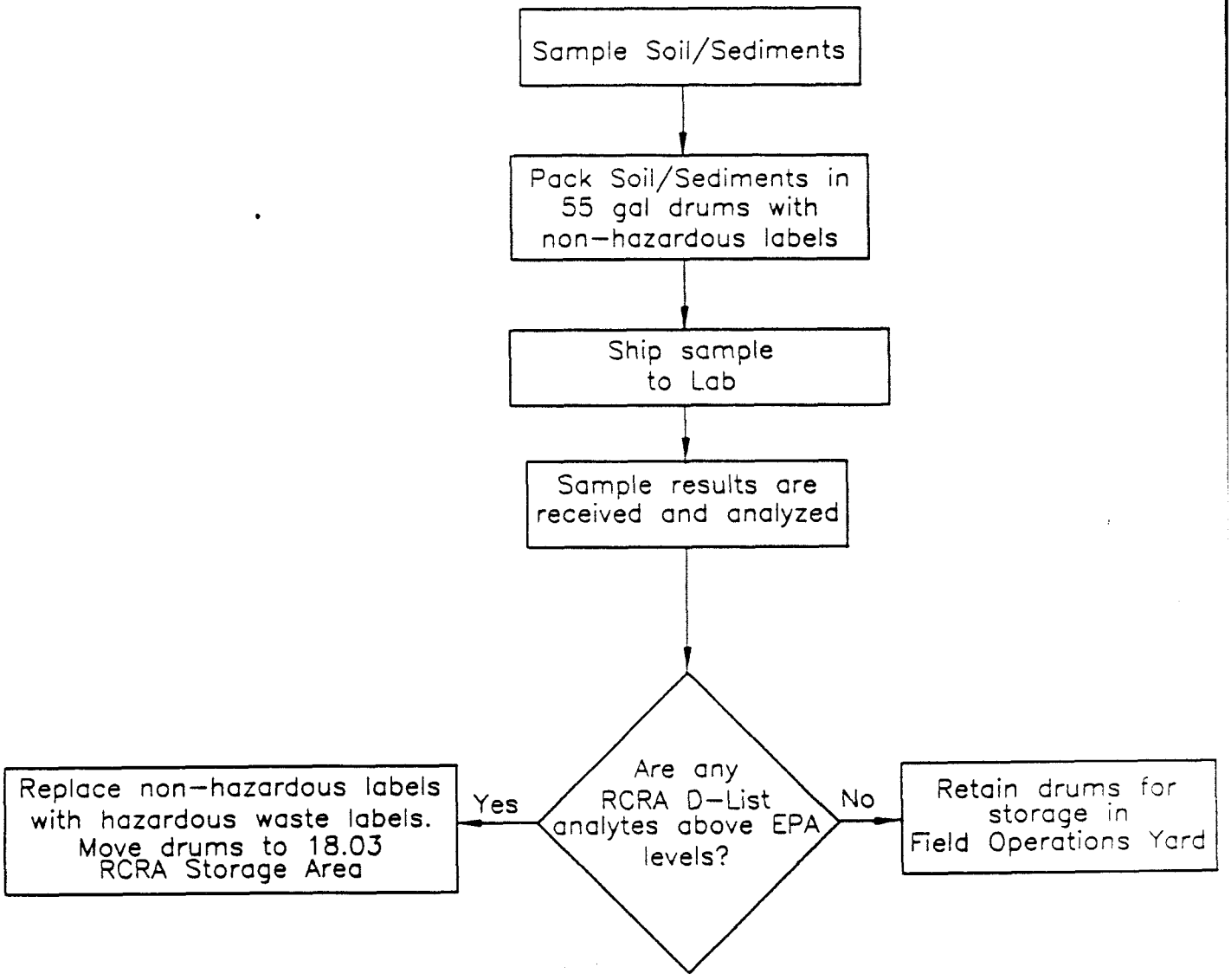
TABLE 3-4

SAMPLING LOCATIONS AND FREQUENCY

MEDIA TO BE SAMPLED	SAMPLE LOCATION	SAMPLING FREQUENCY
Environmental Liquids	2,500-gallon Storage Tank (1)	When Full[1]
	2,500-gallon Storage Tank (2)	When Full[1]
	2,500-gallon Storage Tank (3)	When Full[1]
	2,500-gallon Storage Tank (4)	When Full[1]
	2,500-gallon Storage Tank (5)	When Full[1]
Sediments/Soils from Sumps; Sedimentation Tanks 1, 2, and 3, and Cyclone Separators	Decontamination Pad Sump	Once per week[2]

[1] Full is defined as containing 2,500 gallons of liquid.

[2] Frequency of sediment/solid sampling varies with facility use.



Golder Associates Denver, Colorado

TITLE: DECONTAMINATION FACILITY SOIL/SEDIMENT DISPOSITION

CLIENT/PROJECT: EG&G - ROCKY FLATS DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

DRAWN	TR	DATE	MAY 1994	JOB NO.	933-2672
CHECKED		SCALE		DWG NO./REV. NO.	2672A003
REVIEWED		FILE NO.	2672A003	FIGURE NO.	3-5

3.2.1 Waste Water Tank Sample Collection

The 2,500-gallon waste water storage tanks will be sampled as the tanks become full. Sampling environmental liquids from the 2,500-gallon liquid storage tanks will be performed in accordance with 5-21000-OPS-FO.12, Decontamination Facility Operations, Section 8.4, Environmental Liquids. This OPS describes the health and safety considerations, sampling equipment, and documentation of sampling events.

Sampling equipment will be thoroughly decontaminated before each sample collection in accordance with 5-21000-OPS-FO.3, General Equipment Decontamination. Prior to sampling, the DSC will open the tank and monitor the tank interior with an organic vapor detector (OVD). The samples will be containerized, preserved, handled and shipped in accordance with 5-21000-OPS-FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples. All decontamination and sampling activities will be documented by the sampling personnel using the forms required by the OPSs and black indelible permanent ink. Data must also be recorded in a bound weatherproof field logbook. The analytical parameters, required sample containers, and preservation are described in Table 3-4, Decontamination Facility Environmental Liquids Sample Containers, Preservation, and Holding Times.

Liquid samples are collected by using a bottom-filling bailer approximately 214 centimeters (7 feet) in length and 2.5 centimeters (1 inch) inside diameter (ID). The procedure for sampling liquids from tanks is as follows:

- The equipment is decontaminated before use in accordance with 5-21000-OPS-FO.3, General Equipment Decontamination.
- An exterior ladder is placed against the tank being sampled at an upwind location, and the strap is ratcheted down in accordance with manufacturer's guidelines.

- The top sampling port is opened just enough to insert the probe and monitor the headspace for volatiles with an OVD in accordance with 5-21000-OPS-FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs). Caution is taken not to absorb water in the OVD outlet. If readings are above background, the Health and Safety Officer (HSO) is contacted, the lid is removed, and the tank is allowed to vent for 5 minutes.

- The bailer is then opened, and slowly inserted into the tank to collect the sample from top to bottom. If there are sediments in the bottom of the tank, the sediments are not included in the sample. The bailer is then closed, removed, and emptied into a 1-gallon container. The process is repeated until the container is full. The water is decanted into the appropriate sample container.

- The sample is preserved with acid and the preserved sample is verified $\pm$ pH 2. (See 5-21000-OPS-FO.13.)

- The samples are sealed and labeled in accordance with 5-21000-OPS-FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples.

- After sampling is complete, the lid is installed on the tank and the samples and bailer are transfered to the pad and decontaminated in accordance with 5-21000-OPS-FO.3, General Equipment Decontamination.

3.2.2 Decontamination Pad Sump Sample Collection

Sampling equipment will be thoroughly decontaminated before sample collection in accordance with 5-21000-OPS-FO.3, General Equipment Decontamination. All decontamination and sampling activities will be documented by the sampling personnel using the forms required by the OPS and black indelible permanent ink. Data must also be recorded in a bound weatherproof field logbook. The samples will be containerized, preserved, handled, and shipped in accordance with 5-21000-OPS-FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples. The analytical parameters, required sample containers, and preservation are described in Section 3.3.2, Sump Sampling.

Solid samples will be collected from the entire area of the sump located in a decontamination facility. For sampling, solids from the sedimentation tanks and cyclone separators are combined with the sediments already in the sump. The procedures used to sample these solids are as follows:

- The sludge sampler is decontaminated before sampling in accordance with 5-21000-OPS-FO.3, General Equipment Decontamination.
- The sump grates are removed.
- The sump is monitored for volatile organic compounds (VOCs) with an OVD periodically during sampling activities in accordance with 5-21000-OPS-FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs).
- The soil/sediments in the sump are homogenized, or mixed mechanically with a skid loader (fitted with a sump bucket, the sludge in sump).
- The sump is visually divided into eight equal parts.
- Each part of the sump is sampled with the sludge sampler and composited in a stainless-steel bowl.
- The samples are containerized and labeled in accordance with 5-21000-OPS-FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples.
- The 55-gal drums fitted with inner plastic liners and bags are filled and batched according to the date filled.
- The sampling equipment is decontaminated in accordance with 5-21000-OPS-FO.3, General Equipment Decontamination, and stored the equipment for the next sampling event.

3.3 Analysis Plan

Samples are collected for analysis of certain analytes during the sampling procedure. The analyte list is derived by EG&G during the Data Quality Objectives (DQO) process. EG&G uses the analytical results from the environmental liquid sampling to determine which onsite waste water treatment facility will be used to treat the liquid. The analyte list for the environmental liquids is derived from the acceptance criteria of these waste water treatment facilities. EG&G uses the analytical results from the sediment or soil sampling to determine if the material can be sent to a nonhazardous landfill or if the material requires further management. The analytical suite for this material consists of analyses required for acceptance of waste by nonhazardous landfills. The analyte lists for the environmental liquids and the sediment/soils are presented in this section. If the analytical suite changes as a result of the DQO process, EG&G notifies the DSC.

3.3.1 Decontamination Water Tank Sampling

Samples are collected for gross alpha/beta (α/β), radiation screen (rad screen), NO_3/NO_2 as N, total suspended solids, (TSS) sulfate (SO_4), pH, chloride, turbidity, dissolved metals, total dissolved solids (TDS), and VOC analyses. This analyte list and the container or preservation requirements are presented in Table 3-6.

TABLE 3-6
DECONTAMINATION FACILITY ENVIRONMENTAL LIQUIDS SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES

PARAMETER	EPA METHOD	CONTAINER	PRESERVATIVE	HOLDING TIME
Organic Compounds:				
Purgeable Organics (VOCs)	524.2	3 x 40-ml VOA glass vials with teflon-lined septum lids	Cool, 4°C	7 days
Inorganic Compounds:				
*pH	150.1	1 x 1.0-L polyethylene bottle	Cool, 4°C	Analyze Immediately
*SO_4	375.4	1 x 1.0-L polyethylene bottle	Cool, 4°C	28 days
Dissolved Metals (filtered)	200 Series	1 x 1.0-L polyethylene bottle	HNO_3, 4°C[a]	6 months[b]
NO_3/NO_2 as N	353.2 or 353.3	1 x 250-ml polyethylene bottle	H_2SO_4, 4°C[a]	28 days
*Total Suspended Solids	160.2	1 x 1.0-L polyethylene bottle	Cool, 4°C	7 days
*Total Dissolved Solids	160.1	1 x 1.0-L polyethylene bottle	Cool, 4°C	7 days
*Chloride	325.2 or 325.3	1 x 1.0-L polyethylene bottle	Cool, 4°C	28 days
Radiological Analyses:				
Rad Screen		1 x 125-ml polyethylene bottle	None	None
Gross alpha/beta	c,d,e,f,g,h, i,j	1 x 1.0-L polyethylene bottle	HNO_3[a]	None

[*] One container provides enough liquid sample to conduct analyses for pH, SO_4, TSS, TDS, and Cl.
[a] Acid is added to a pH of less than 2 as a preservative
[b] Holding time for mercury is 28 days
[c] U.S. Environmental Protection Agency, 1979. Radiochemical Analytical Procedures for Analysis of Environmental Samples. Report No. EMSL-LY-0539-1. Las Vegas, NV.
[d] American Public Health Association, American Water Works Association, and Water Pollution Control Federation. 1985. Standard Methods for the Examination of Water and Wastewater. 16th ed. Washington, D.C.
[e] U.S. Environmental Protection Agency. 1976. Interim Radiochemical Methodology for Drinking Water. Report No. EPA-600/4-75-008. Cincinnati USEPA.
[f] Harley, J.H., ed., 1975. HASL Procedures Manual, HASL-300. U.S. Energy Research and Development Administration, Washington, D.C.
[g] USAEC Handbook of Analytical Procedures. 1970. Grand Junction Lab. pp. 196.
[h] Prescribed Procedures for Measurement of Radioactivity in Drinking Water. 1980. EPA-600/4-80/032. August.
[i] U.S.G.S Book 5. 1977. Methods for Determination of Radioactive Substances in Water and Fluvial Sediments, Chapter A5.
[j] USEPA. 1979. Acid Dissolution Method for the Analysis of Plutonium in Soil. EPA-600/7-79-081. March.

3.3.2 Sump Sampling

Samples are collected for isotopic analysis (plutonium, americium and uranium isotopes), rad screen, and nonrad [VOA-Toxicity Characteristic Leaching Procedure (TCLP); TCLP Regulated herbicides and pesticides; semivolatile organic compounds (SVOCs); metals-TCLP; NO_3/NO_2; pH; H_2S; and, CN analytes]. This analyte list and the container and preservation requirements are presented in Table 3-7, Decontamination Facility Sediment/Soils Sample Containers, Preservation, and Holding Times.

3.4 Sample Handling

Sample handling and shipping will be in accordance with 5-21000-OPS-FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples; and 4-B11-ER-OPS-FO.25, Shipments of Radioactive Materials and Samples. If any questions arise, EG&G Sample Management will be contacted.

Rad screen samples should be shipped priority overnight on the same day as the sampling event to a designated laboratory assigned by EG&G Sample Management. Before shipment, all rad screen samples are surveyed for radioactivity in the following manner: The sample bottles are surveyed by performing a direct frisk using a Bicron Frisk-Tech with A-100 probe and a Bicron Frisk-Tech with B-50 probe (or equivalent per Radiological Engineering). A smear survey for removable contamination is performed and counted using a Ludlum Model 2929 with 43-10-1 probe (or equivalent per Rad Engineering). The Health and Safety Specialist uses the results of these surveys for determination of unrestricted release for the samples. Shipment of the rad screen sample(s) must be in accordance with Department of Transportation regulations. Rad screen results should be sent by facsimile from the laboratory the following day to the DSC

TABLE 3-7
DECONTAMINATION FACILITY SEDIMENT/SOILS SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES

PARAMETER	EPA METHOD	CONTAINER	PRESERVATIVE	HOLDING TIME
Organic Compounds:				
TCLP[1]-Regulated Pesticide/Herbicide	8080/8150	1x250-ml wide-mouth glass jar	Cool, 4°C	TCLP Extract in 7 days Analyze within 40 days
TCLP[1]-Volatile Organic Compounds (VOCs)	8240	1x125-ml wide-mouth glass jar	Cool, 4°C	TCLP Extract in 14 days Analyze within 14 days
Inorganic Compounds:				
TCLP[1] Metals	7000 Series 6010 (ICP)	1x250-ml wide-mouth glass jar	Cool, 4°C	TCLP Extract within 28 days Mercury analysis within 28 days Analyze rest in 180 days
pH	150.1	1x250-ml wide-mouth glass jar[2]	Cool, 4°C	Immediately
NO_3/NO_2 as N	353.2	1x250-ml wide-mouth glass jar[2]	Cool, 4°C	28 days
H_2S	376.1	1x250-ml wide-mouth glass jar[2]	Cool, 4°C	7 days
Cyanide	335.3	1x250-ml wide-mouth glass jar[2]	Cool, 4°C	14 days
Radiological Analyses:				
Rad screen		1x125-ml wide-mouth glass jar	None	None
Plutonium, Americium, Uranium		1x500-ml wide-mouth glass jar	None	None

[1] Samples will be prepared using EPA Method 1311 (TCLP).
[2] One container provides sufficient sediment/soil sample to conduct analyses for pH, nitrate/nitrite, H_2S, and cyanide.

TABLE 3-7
(CONCLUDED)

[a] U.S. Environmental Protection Agency. 1979. Radiochemical Analytical Procedures for Analysis of Environmental Samples. Report No. EMSL-LY-0539-1. Las Vegas, NV.
[b] U.S. Environmental Protection Agency. 1976. Interim Radiochemical Methodology for Drinking Water. EPA-600/4-75-008.
[c] Harley, J.H., ed. 1975. HASL Procedures Manual, HASL-300. U.S. Energy Research and Development Administration. Washington, D.C.
[d] U.S.G.S Book 5. 1977. Methods for Determination of Radioactive Substances in Water and Fluvial Sediments. Chapter A5.
[e] USEPA. 1979. Acid Dissolution Method for the Analysis of Plutonium in Soil. EPA-600/7-79-081. March.
[f] E.H. Essington and B.J. Drennon, Los Alamos National Laboratory, a private communication. Procedures for the Isolation of Alpha Spectrometrically Pure Plutonium, Uranium, and Americium.
[g] Rocky Flats Plant, Health, Safety, and Environmental Laboratories. Isolation of Americium from Urine Samples.
[h] USEPA. Radioactivity in Drinking Water. 570/9-81-002.

sample manager and the EG&G Project Manager. (No samples are shipped offsite without rad screen results.)

For nonradiation and the environmental liquid gross α/β samples, the Rush box is marked, and 10-day turnaround is requested on the Chain-of-Custody (COC). A facsimile of the results is also requested for the decontamination operations facility manager and EG&G Decontamination Operations Project Manager. The charge number for analytical costs should be obtained from EG&G Sample Management, and be included in the upper righthand corner of the COC. Include a copy of the rad screen results with the COC(s). All samples should be shipped priority overnight; nonrad samples must be shipped with blue ice at 4°C.

The environmental liquid gross α/β samples will be shipped to an approved radiochemistry laboratory unless rad screen results are greater than 2,000 ρCi/ml for specific activity of the sample or unless the total activity of the sample is greater than 0.01 microcurie (μCi). If the rad screen results are greater than these levels, the DSC will contact EG&G Sample Management for instructions and a laboratory assignment.

Priority overnight service will be used when soil or sediment rad samples are shipped.

All COCs will exhibit the following request: Send copy of results to EG&G Decontamination Operations Project Manager at EG&G Rocky Flats Plant, 901 Contractors Pad, T891 E, Golden, Colorado 80402.

3.5 Data Management

The DSC provides timely entry, editing, and delivery of all sample collection information generated during sampling events at the decontamination facilities. The information will be

provided in electronic format in accordance with 5-21000-OPS-FO.14, Field Data Management, and EG&G requirements and programs (such as Datacap). Both sample collection and tracking information will be delivered to the Rocky Flats Environmental Data System (RFEDS) on a weekly basis. The RFEDS is used to track, store, and retrieve project data. The sample collection information to be provided includes sample number, volume, sampler's name, sampling date, analyte list, and COC number in accordance with 5-21000-OPS-FO.14, Field Data Management. The DSC will also backup all electronic files daily and file all hardcopy data forms and field notes.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

4.1 Data Quality Objectives

The DQO process, as outlined in Data Quality Objectives for Remedial Activities (EPA 1987), is used by EG&G in developing this FSP. The DQO process ensures that project objectives are defined, identifies the environmental data necessary to meet these objectives, and ensures that the data collected are sufficient and of adequate quality for the intended use. The DQO process specific to the Environmental Restoration Program is presented in Appendix A of the RFP Site-Wide Quality Assurance Project Plan (QAPjP) (EG&G 1992).

The DQO process is an iterative process designed to focus on the decisions that must be made and to help ensure that site activities that involve data collection are logical and cost effective. The DQO process has three stages. Although the three stages are discussed sequentially in this document, the stages are implemented in an interactive and iterative manner whereby all DQO elements are continually reviewed and re-evaluated. As such, the DQO process is integrated with development of the FSP and may be revised as needed, based on the results of each data collection activity. DQOs are developed by using the three-stage process described in the following sections and tailored to the decontamination facility's FSP.

4.1.1 Stage 1 - Identify the Decision Types

Stage 1 defines the types of decisions that will be made with the data. In Stage 1, all available site information is compiled and analyzed to evaluate potential requirements for disposal of wastes generated at the decontamination facilities. The information obtained is used to identify deficiencies (data gaps) in the existing information. The outcome of Stage 1 is a definition of

the decontamination facilities and FSP objectives and an identification of data gaps to assist in developing proper waste stream definition, handling, and disposal.

4.1.2 Stage 2 - Identify Data Uses/Needs

Stage 2 involves specifying the data necessary to meet the objectives set in Stage 1. Stage 2 includes identifying data types, data quality needs, data quantity needs, and evaluating sampling and analysis options. In this stage, sampling approaches and the analytical options are selected for the site, and multiple-option approaches are evaluated to allow for more timely or cost-effective data collection and evaluation. Tables 3-3, 3-4, and 3-5 have been prepared as a result of Stage 2.

4.1.3 Stage 3 - Design Data Collection Program

Stage 3 specifies the methods to be used to obtain and document data of acceptable quality in products such as the FSP or a workplan. This FSP and 4-I48-ENV-OPS-FO.12 constitute realization of Stage 3.

4.2 Field QA/QC

Samples of the environmental liquids and sediments or soils at the decontamination facilities are collected for waste characterization. One field duplicate is collected for every 20 samples for water and every 10 samples for soil/sediments.

The DSC performs routine inspections at the decontamination facilities for compliance with this FSP and applicable OPSs.

4.3 Laboratory and Analytical QA/QC

Laboratory and analytical QA/QC requirements are set forth in the General Radiochemistry and Routine Analytical Services Protocol (GRRASP) (EG&G 1991).

4.3.1 PARCC Parameters

The PARCC parameters consist of precision, accuracy, representativeness, comparability, and completeness. These parameters are indicators of data quality, and the degree of quality coincides with the analytical support level chosen. The levels are distinguished by the types of technology and documentation used and their degree of sophistication. The Decontamination Facilities operate on Level IV-CLP Routine Analytical Services (RAS). This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data.

- Precision and Accuracy

  Precision is a quantitative measure of data which refers to the reproducability or degree of agreement among replicate measurements of a single analyte. Accuracy is a quantitative measure of data quality which refers to the degree of difference between measured or calculated values and the true value. The Decontamination Facility insures precision and accuracy by using CLP certified laboratories for data analysis. In addition, the data is checked by independent, qualified data validators following EPA/CLP protocol.

- Representativeness

  Representativeness is a qualitative measure of data quality defined by the degree to which the data accurately and precisely represent a characteristic of a

population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is obtained at the Decontamination Facility by sampling the entire vertical column of water in the storage tanks, and by homogenizing the soil/sediments and taking composite samples.

- Completeness

  Completeness is a quantitative measure of data quality expressed as the percentage of valid or acceptable data obtained from a measurement system. The goal of completeness at the Decontamination Facility is 100 percent; however, this is not a requirement. If completeness falls below 85%, a study will be conducted to find ways to improve the number.

- Comparability

  Comparability is a qualitative measure defined by the confidence with which one data set can be compared to another. The Decontamination Facility optimizes comparability by adhering to sampling procedures specified in 4-I48-ENV-OPS-FO.12, Decontamination Facility Operations, and this Field Sampling Plan for Main and Protected Area Decontamination Facilities.

4.4 Project QA/QC

The Environmental Restoration Management Quality Assurance Project Plan (QAPjP) identifies QA objectives for data collection, analytical procedures, calibration, and data reduction, validation, and reporting. The QAPjP, in conjunction with OPSs, completes the FSP. All field and analytical procedures will be performed in accordance with the methods described in the QAPjP and OPSs unless otherwise specified in this FSP.

5.0 REFERENCES

EG&G Rocky Flats, Inc. (EG&G). 1991. General Radiochemistry and Routine Analytical Services Protocol (GRRASP), Version 2.1, ER Program, Rocky Flats Plant, Golden, Colorado. July 2.

EG&G Rocky Flats, Inc. (EG&G). 1992. Rocky Flats Plant Site-Wide Quality Assurance Project Plant for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities, ER Program, Rocky Flats Plant, Golden, Colorado. June.

U.S. Environmental Protection Agency (EPA). 1987. Data Quality Objectives for Remedial Response Activities. EPA 154-IG-871003, OSWER Directive 9355.0-7B. March.